1: Adv Perit Dial 1993;9:25-30

Related Articles, Links

The effect of glucose polymers on water removal and protein clearances during CAPD.

Imholz AL, Brown CB, Koomen GC, Arisz L, Krediet RT.

Department of Medicine, Academic Medical Center, Amsterdam, The Netherlands.

Two selected groups of 5 continuous ambulatory peritoneal dialysis (CAPD) patients (3 female, 7 male), mean age 60 years, were studied twice with an interval of 4 weeks. The first study was done with glucose-containing dialysate and the second study with dialysate containing glucose polymers (Dextrin 7.5%) after they had been treated with this solution (night dwell) for 4 weeks. The patients collected night bags for 3 consecutive days during the tests. Protein clearances were determined for beta 2-microglobulin, albumin, IgG, fibronectin, and alpha 2-macroglobulin in both periods to examine the influence of crystalloid-induced convection versus "colloid"-induced convection. Group I normally used 1.50% glucose and was therefore considered to have a "high ultrafiltration";group II was the "low ultrafiltration" group because they needed 4.25% glucose dialysate. For their usual glucose solutions the net ultrafiltration was not different between both groups, but the clearance of beta 2-microglobulin was higher in group II:839 +/- 98 microL/min (group I) and 1135 +/- 131 microL/min (group II) ($p = 0.08$). For glucose polymers the net ultrafiltration increased in both groups, but this was more pronounced in group II: 657 +/- 104 mL (group I) and 918 +/- 85 mL (group II) ($p = 0.06$). Also, the clearance of beta 2-microglobulin increased with the glucose polymer solution: 1268 +/- 94 microL/min (for glucose polymer) and 987 +/- 85 microL/min (for glucose) ($p < 0.05$), but the clearances of the larger serum proteins remained unaffected.(ABSTRACT TRUNCATED AT 250 WORDS)

PMID: 7692975 [PubMed - indexed for MEDLINE]

Display Abstract Sort Save Text Clip Add Order

A randomized multicenter clinical trial comparing isosmolar icodextrin with hyperosmolar glucose solutions in CAPD. MIDAS Study Group. Multicenter Investigation of Icodextrin in Ambulatory Peritoneal Dialysis.

Mistry CD, Gokal R, Peers E.

Institute of Nephrology, Cardiff Royal Infirmary, Wales, United Kingdom.

The osmotic effectiveness of a large molecular weight glucose polymer fraction (Icodextrin) as a novel "colloid" osmotic agent in peritoneal dialysis was established, but the long-term safety remained undetermined. A randomized, controlled multicenter investigation of Icodextrin in ambulatory peritoneal dialysis (MIDAS) was undertaken to evaluate the long-term safety and efficacy by comparing daily overnight (8 to 12 hr dwell) use of isosmolar Icodextrin (282 mOsm/kg) with conventional 1.36% (346 mOsm/kg) and 3.86% (484 mOsm/kg) glucose exchanges over six months. Two hundred and nine patients were randomized from 11 centers, with 106 allocated to receive Icodextrin (D) and 103 to remain on glucose (control group; C); 138 patients completed the six month study (71 C, 67 D). All patients were divided into weak (1.36%) or strong (3.86%) subgroups based on their use of glucose solutions overnight during the pretreatment baseline period. The mean (+/- SEM) overnight ultrafiltration (UF) with D was 3.5 times greater than 1.36% glucose at eight hours [527 +/- 36 vs. 150 +/- 47 ml; 95% confidence interval (CI) for the difference +257 to +497 ml; $P < 0.0001$] and 5.5 times greater at 12 hours (561 +/- 44 vs. 101 +/- 48 ml, 95% CI for the difference +329 to +590; $P < 0.0001$) and no different from that of 3.86% glucose at eight hours (510 +/- 48 vs. 448 +/- 60 ml, 95% CI for the difference -102 to +226 ml; $P = 0.44$) and at 12 hours (552 +/- 44 vs. 414 +/- 78 ml, 95% CI for the difference -47 to +325 ml; $P = 0.06$).(ABSTRACT TRUNCATED AT 250 WORDS)

Publication Types:
- Clinical Trial
- Multicenter Study
- Randomized Controlled Trial

PMID: 7967363 [PubMed - indexed for MEDLINE]

1: Kidney Int 1996 Sep;50(3):979-86

Peritoneal transport characteristics with glucose polymer based dialysate.

Ho-dac-Pannekeet MM, Schouten N, Langendijk MJ, Hiralall JK, de Waart DR, Struijk DG, Krediet RT.

Department of Nephrology, Academic Medical Center, Amsterdam, The Netherlands.

Dialysate fluids containing glucose polymers as osmotic agent are different from the conventional solutions, because they are iso-osmotic to plasma and produce transcapillary ultrafiltration (TCUF) by colloid osmosis. To investigate the effects on fluid and solute kinetics, a comparison was made between a 7.5% glucose polymer based dialysate (icodextrin) and 1.36% and 3.86% glucose based dialysate in 10 stable CAPD patients. In each patient three standard peritoneal permeability analyses (SPA) were done with the osmotic agents and concentrations mentioned above. Dextran 70 was added to the glucose solutions to calculate fluid kinetics. In the glucose polymer SPAs fluid kinetics were calculated from the dilution and disappearance of dextrin. The TCUF rate with icodextrin was closer to that obtained with 3.86% glucose than to 1.36% glucose. Extrapolation of the fluid profiles revealed sustained ultrafiltration with icodextrin. TCUF increased linearly in time in the icodextrin tests, whereas a hyperbola best described the glucose profiles. The effective lymphatic absorption rate with icodextrin was similar to the glucose based solutions. Mass transfer area coefficients of low molecular weight solutes with icodextrin were also similar to the values obtained with glucose, as was D/P creatinine. A positive correlation was present between the MTAC creatinine and the TCUF rate with icodextrin ($r = 0.66$, $P = 0.05$), which was absent in the glucose SPAs. This suggests that in patients with a larger effective peritoneal surface area, more ultrafiltration can be achieved by glucose polymer solutions. Clearances of beta 2-microglobulin (beta 2m) were higher with icodextrin than with 3.86% glucose and 1.36% glucose dialysate ($P < 0.05$). No differences were found for the larger serum proteins albumin, IgG and alpha 2-macroglobulin. Initial D/PNa-->was higher (0.96) with icodextrin than with the glucose based solutions (0.92), due to the higher Na+ concentration of icodextrin, and it remained unchanged during the dwell. In contrast, D/PNa+ of 1.36% glucose increased during the dwell, whereas D/PNa+ decreased with 3.86% glucose until 60 minutes, followed by a subsequent increase. The ultrafiltration coefficient (UFC) of the total peritoneal membrane was assessed using 3.86% glucose (0.18 +/- 0.04 ml/min/mm Hg), and the UFC of the small pores was assessed using icodextrin (0.06 +/- 0.008 ml/min/mm Hg). The difference between these represented the UFC through the

transcellular pores, which averaged 50.5% of the total UFC, but with a very wide range (0 to 85%). An inverse relation existed between the duration of CAPD treatment and the total ultrafiltration coefficient ($r = -0.68$, $P < 0.04$), which could be attributed to a lower UFC of the transcellular pores in long-term patients ($r = -0.66$, $P < 0.05$), but not to the UFC of the small pores ($r = -0.48$, NS). The TCUFRo-60 min through the transcellular pores correlated with the sodium gradient, corrected for diffusion, in the first hour of the dwell ($r = 0.69$, $P < 0.04$), indicating that both parameters indeed measure transcellular water transport. It can be concluded that the glucose polymer solution induced sustained ultrafiltration and had no effect on peritoneal membrane characteristics. In addition, the results of the present study support the hypothesis that the glucose polymer solutions exerts its osmotic pressure across intercellular pores with radii of about 40 A. This leads to increased clearances of low molecular weight proteins such as beta 2m that are transported through these pores without sieving of Na+. The latter, as found during 3.86% glucose dialysate, is probably caused by transcellular water transport. The transcellular water transport accounted for 50% of the total ultrafiltration with glucose based dialysis solutions. It was lower in long-term CAPD patients.

Publication Types:

- Clinical Trial

PMID: 8872974 [PubMed - indexed for MEDLINE]
